AMERICAN

RAILROAD JOURNAL,

AND

MECHANICS' MAGAZINE.

No. 12, Vol. VIII. New Series.] JUNE 15, 1842. [Whole No. 408. Vol. XIV.

The present number concludes the eighth volume of this Journal and the tenth entire year of its publication. Of the value of the matter contained in the work we do not at present intend to say any thing; that it *might* have been greater we will not deny, but we can safely declare that under existing circumstances we have done all that could have been done. It must be remembered however, that the means of conducting and giving value to any periodical, but particularly to one of a technical or scientific character are directly dependant upon the encouragement it receives, and this encouragement does not exist alone in reading the work, for which however we return our best thanks, but in a more substantial return for value received.

As all our readers are acquainted with mathematical language we may make ourselves better understood by stating the fact above mentioned in the form of an equation.

Let I represent *one* or each individual who takes the Journal.

Let V represent a good current five dollar bill or its equivalent.

Let x represent the number of those who send us V each year:

Let y represent the number of those who do not send it.

Then x I V + y I 0 = the encouragement we receive = E

but y I 0 = 0*

X I x + 0 = x I V = E

* There are some cases in which I must be affected by a coefficient, representing the number of years in arrears, but as the result is 0 it does not alter the value of E, and would only render the equation more complicated.

The quantities x and y being unknown it only concerns each individual to recollect that "*I* must send V."

—

The next number of this Journal will contain an announcement of the arrangements which have been made to give increased value to its pages and to obtain the co-operation of the most distinguished writers and laborers in the cause of internal improvement.

We cannot but think that the durability of rolled rails has been too hastily called into question. Well rolled iron is not subject to exfoliation by the simple action of rolling, however long continued, and when this effect is observed, it will be found to result from a want of homogenous structure in the iron—or in other words, from an imperfectly wrought metal, as our correspondent has properly observed. Any defect in the original piece of metal is merely extended by the subsequent rollings, and although deficiency in the manufacture may thus be concealed, this will not fail to become manifest after a while. It would surely be folly to abandon the use of rolled iron, because in a very few cases, it has been found defective.

But there is the advantage in favor of rolled iron, that its defects if any are extended longitudinally, over the bar, forming a sort of fibre, and but little impair the transverse strength, while cast iron bars are liable to defects in a transverse direction, giving rise to more sudden failures and productive of more serious consequences.

Another thing to be taken into consideration is, that from the infancy of the science of railway structure, the mode of joining the rails and adapting their ends, generally very imperfect, has given rise to inequalities of surface, elevating the end of one rail and depressing that of the other, thus producing an obstacle injurious both to the engine, the cars, and to the rails. Whenever this has taken place, a rounding off may be seen on the end of the rail, and it is here chiefly that what is called exfoliation may be observed, and only in a very slight degree. The removal of this difficulty, however obvious, need not be considered in this place as it equally concerns both kinds of rail.

[For the American Railroad Journal and Mechanics' Magazine.]

DURATION OF RAILWAY IRON.

I have perused an able article relative to the *duration of iron railways*, in your last number, and I cannot but express my surprise

at the opinion uttered by Mr. Ellwood Morris, to wit: "*that rolled iron edge rails, of the T and H forms, will not endure more than ten years.*"

In the first place, we would state that our experience both in this country and in England, with the edge rail, does not extend over a period to exceed eight years. It being generally understood, that the credit of this improvement is due to an American, Col. Stevens of New Jersey, who rolled the first edge rails, on a visit to England for this purpose, 8 years ago, and then introduced them into this country by their application to the Camden and Amboy railroad. Thus far we have no account of their having failed in the least. With respect to the flat bar, the experience, both in this country, and in the coaleries of England where iron railways have been in constant use for twice ten years, an entirely different result is found.

It is true, as remarked by your correspondent, that much depends on the ore from which the iron rails are made. Then again, as to the perfection in the working of the ore, the quality of the iron, if hard or soft, prior to the rolling of the bars. Much rolled iron has been palmed off on us, that hardly deserves the name of iron.

An instance of defective iron is presented in a portion of the "fish belly" rail, pattern on the New York and Harlem railroad.— This iron is of a coarse and imperfect quality. Yet, this flat bar has sustained the wear of very ill constructed four wheeled cars, every 10 to 30 minutes during the day for near ten years, and has conveyed some 7 or 8 millions of passengers. The only wear perceptible, is at the junction of the bars. This has occurred mainly from the sledge hammer action of these cars with four wheels in the centre, distant from the ends of the cars. The cars being thrown ont of balance, or on a tilt, by the irregular distribution of the weight of the passengers often standing on the projecting platform of the cars, to enjoy the pleasure of their cigars, while the draught of the horses on the tilt gives a regular pounding motion. At the junction of the iron rails we find them bruised and often exfoliated. This more frequently occurs where the granite longitudinal sills, (now generally abandoned,) serve as the anvil for the wheels to bruise the ends and thus to test severely its endurance.

But, to prove that the transportation of one and a half or two millions of tons over an edge rail will not ruin any road, we will give a quotation from de Pambour, furnished us by a professional

friend, (page 286) where it is shown, "that in the year ending 1st July 1834. 515,252 Tons gross, not including the weight of the engines and their tenders, passed over the Manchester and Liverpool railway," and (page 287) "558,427 Tons gross, passed over the Stockton and Darlington railroad the same year." The idea that 1,500,000 tons of freight as stated by Mr. Morris will wear out, or use up the rails of any decently constructed and located railway in ten years, even a plate rail, is preposterous.

The London and Birmingham railroad, and many other railroads in England, and on the continent, would by this time require new rails, and then, consider the speed on the English railways. Of cast iron rails de Pambour says; "The lowest price I have ever heard of was 2½ cents per pound. Fifty six dollars per ton = about the average price of best English rolled rails delivered in New York, in 1841. But, twice the weight of cast iron, would not be as safe as the ordinary rolled iron rail, so that we could well afford $120 per ton for rolled iron and have a better road, than with cast iron rails, even at 2½ cents per pound delivered in New York. The price of $120 would command American rolled iron made with charcoal and would do not a little, to still further increase the difficulties under which the railway system labors, especially in New York. For, if in addition to the absolute prohibition from carrying freight, as at present, the price of iron rails be doubled, it will be impossible to extend a system, which is at least as much required here, as in any State of the Union, to keep pace with our neighbors.

We may be uncharitable but we fear Mr. Morris in his zeal to advance the trade of cast iron rails in Pennsylvania, has indiscretely given a side thrust at the railway cause that smacks strongly of the education of a canal engineer. We are led to this remark, as we find he quotes the views of the canal commissioners of Pennsylvania to support them, who we regret to find exhibit the same prejudices against "the better improvement of the age," as the canal commissioners of the State of New York have exhibited on several occasions. The latter, still permit the exploded heresy to be before the public, (see in one of our State reports,) that, "the average *cost* of transportation on the Baltimore and Ohio railroad, and on the Liverpool and Manchester railroad, *when reduced to a level*, is $3 and 56 cents per ton per mile. This allows no freight or tolls. It may therefore be considered, that experience has thus far (1835, Assem. Doc. No. 396) settled the cost at 3½ cents per ton per mile on a level road," and they further state, in this famous re-

port, "taking the facts we have obtained, as a basis, we find the relative cost of conveyance, is as four and one-third, to one, in favor of canals,—this is exclusive of tolls and profits."'

As a practical querie and test of the sincerity of the canal advocates, in their belief of this report, we would ask, (although a digression from the subject,) why refuse the railways, parellel to the line of the Erie canal, the permission to carry freight, *at all seasons*, or on their submitting to the unjust tax of paying canal tolls, into the State Treasury? The truth is, the canal advocates both in Pennsylvania and in this State shun an investigation into the cost of transportation on well constructed railways, and their relative, merits compared with canals and are disposed to give them a side blow, when opertunity offers. They each have their seperate advantages and can work together, but these are locations with descending lines, (as from Lake Erie to the Hudson,) over which freight *if in large quantities*, can be carried by railroads as cheap, if not cheaper than by the canal.

J. E. B.

THE PARIS RAILROAD ACCIDENT.

Our readers have by this time seen most of the details of this horrid catastrophe, but as a matter of record and as a warning we transfer the best account we can find, to our pages, together with such remarks as have been made by scientific men who were upon the spot.

The accident seems to have been caused by a high velocity and the use of two locomotives, the first being a weak one, upon four wheels, when the axle broke, the second engine became a wreck upon the ruins of the first, and the newly painted cars being piled in a mass upon the fires were consumed with the most dreadful rapidity. The terrible destruction of life, however, was owing to the barbarous practice of locking the passengers in the cars. The reason given for this, was that persons were in the habit of commiting suicide by jumping from the cars, and thus this overwise precaution has been the means of destroying nearly as many, if not more lives than can be charged to all the railroad accidents on record.

We have noticed with surprise that this custom has been adopted on some of our own roads; but as the suicidical propensities of our nation can not be assigned as a reason for it, we are inclined to suspect that it arises from a desire to prevent evasion of payment—no

other reason being apparent. Be this as it may we hope this warning will produce a change. Indeed, the whole history of this catastrophe is worthy of serious consideration.

"We find the following in the *Montteur Parisien;* "Scarcely had the train quitted the Bellevue station than the axletree of the first locomotive, the *Mathieu Murray,* broke. The shock drove it off the rails, and it was instantly stopped. The second locomotive, which had all its power on, rose over the first, breaking it to pieces, and crushing the conductor and strokers. In the concussion it was also broken, and the fire and grease-boxes fell upon the ground.—At the same moment, the three first wagons were dragged upon the locomotives and were broken to pieces. Most of the persons in these wagons were enabled to escape by throwing themselves out of the windows; but about forty, who were too much injured to follow the example, were burned to death by the fire, which had communicated itself to the wagons from the locomotives. The fourth wagon and those which followed did not share the same fate, but the passengers received severe wounds or contusions, and as soon as it was possible to ascertain the extent of the disaster, it was found that more than fifty persons were so severely injured that it was impossible to remove them on the instant. The prefect of police, having been apprized of the calamity, soon arrived from Paris with twenty medical men and some municipal guards on horseback. The wounded were dressed, many amputations being performed on the spot, and were then conveyed with all possible care to the neighboring chateaus, the owners of which received them with great readiness. As to the unhappy victims of the first three wagons, it was with great difficulty that the remains and ashes of forty-two persons could be extricated. They were so dreadfully burnt that from thirty-four to thirty-five were not recognizable. Seven only were females. These sad remains were conveyed in a wagon to the railway station in Paris, where they were laid in the waiting room. In the morning, seven bodies, which were in a state to be recognized, were removed to the Morgue; the others were conveyed to the cemetery of Mont Parnasse for interment, previously to which they were exposed, as also those remains of their clothing which might assist recognition. The perfect of the police did not quit the scence of the accident until 4 o'clock in the morning."

The same journal adds the following summary additional particulars communicated after the writing of the above account:—

"It is said that the second wagon, in striking against the first,

dashed in the hinder part, and went partly into it, breaking the limbs of the unfortunate persons who were there, and, by blocking up the space, rendered it impossible for them to escape the fire, which broke out almost immediately after. As soon as the crash took place, a general panic seized on the passengers; the persons placed on the roofs threw themselves down from the height; those inside making wild and unavailing efforts to get out by the windows of the fast fixed doors. The horror of the disaster at this moment may be imagined. The fire had communicated to the heap of broken carriages and boilers, in the midst of which were struggling with each other the wretched victims of the accident! Some covered with blood, others scalded with the boiling water, were, when they escaped from the heap, seen running here and there, whilst others again perished in the flames, without the possibility of assistance being given them! We saw one person who happened to be in the foremost compartment of a carriage, and who, though he had received no wound, had experienced such an emotion of fright that his memory totally failed him, and he remembered nothing.

"Wednesday morning Messrs. Majendie, Amussat, and some other physicians repaired to the cemetery of Mont Parnasse, to make observations on the bodies of those who perished. On the suggestions of M. Lhopital, the keeper of the cemetery, orders had been given by the Commissary of Police of the district, to spread chlorate of lime over the dead bodies to preserve them as long as possible. M. Ganal, who happened to be there for an exhumation, remarked that chlorate of lime, which has the property of decomposing putrid gasses, attacks the flesh of dead bodies and hastens putrid fermentation. He suggested an external application for momentarily stopping the decomposition, which was immediately applied.

"The bodies now lying at the cemetery of Mont Parnasse amount to 27, some of those at first brought there having been removed. It is utterly impossible to recognize one of them, every feature being gone, and the whole body being more or less calcined. On none can a finger or toe be seen, though the stumps still remain. The teeth are generally white and uninjured, giving another proof of the indestructibility of that part of the human frame. It was by her teeth that Madame Dumont d'Urville was recognized. The color is in all cases the same—a dark brown, such as is seen on smoked hams or bacon. The abdomen is in all cases in better preservation than the other portions of the bodies. The reason is,

that the strong integuments which covered it allowed the liquid matter below to become heated, or even to boil, without the external coat being destroyed. In one body the upper and lower jaws, as well as the malar bones, are completely destroyed, yet the tongue is perfectly soft and moveable in the mouth. In another, the upper part of the skull is burnt off, and the adjacent bones completely calcined; yet the brain is soft to the touch, and the thin membrane unbroken. Five or six have the hands held up before their faces as if defending themselves from the attacks of the flames. In that position they met their fate. Messrs. Ausat, Majendie, Olliffe, and other physicians, who have visited the cemetery, have declared the case to be such as may never again be witnessed. They have suggested that an application should be made to the minister of the interior to have these remains, if unclaimed, or at least part of them, in the Pathological Museum.

"The Societe de Geographie, of which Admiral Dumont d'Urville was president, directed the most minute search to be made for his remains. His body was at length found, but in a frightful state. The action of the fire upon it had been so intense that all his limbs were nearly consumed, and of one of his arms only a few inches remained. The identity was rendered possitive by the following circumstance:—Whilst the search for the body was making, M. Dumoustier, professor of phrenology, and who was attached to the last expedition of the *Astrotabe*, commanded by the illustrious navigator, conceived that he discovered, among the fragments in the cemetery of Mont Parnasse, a skull having left upon it a small portion of the scalp which struck him as corresponding with that of the Admiral, which was of peculiar conformation, and from which he (M. Dumoustier) had in life taken several casts. His opinion was confirmed on comparing this relic with the plaster casts of the Admiral's head still in the possession of the phrenologist. Precautions had been taken by the authorities to place side by side the remains of the victims found in each carriage, and guided by certain indications of a complaint to which Madame Dumont d'Urville had recently been subjected, M. Dumoustier was enabled also to identify her remains, and other scientific data also made him recognise beyond all doubt those of their son."

An English gentleman, who was in one of the cars, says:—

"A minute or so before the accident, I became alarmed at the velocity with which we were traveling, and observed to a friend

who was with me, that the slightest obstruction in the road, even in a stone, would be sufficient for our destruction. My fear was, that the engineer had lost all control over the locomotive, and we would run over one of the high banks, which are numerous on the road—when every person must have been killed. When the shock took place, I endeavored to get the door of the carriage in which I was setting, open, but it was locked, by way of precaution, it seems, against persons throwing themselves out and commiting suicide, as was done by an agent de change about a year ago. As the wind was fresh the windows were up. I broke one of these, and rushed out, as the train had stoped. On looking before me, I saw five or six of the first carriages actually piled upon each other, for it appears we had a locomotive pushing from behind, as well the two in front, and the impulse had driven the carriages over each other, so that they formed a mass as high as the first floor of a house. The fire from the locomotive had reached the carriages, and they were burning furiously. The screams of the females were awful; never shall I forget the appaling sounds of agony and dread that reached my ears. The clothes of one female had caught fire, and every attempt to extricate her was in vain, for her legs were jammed in among the fractured timber of the carriage, and all who attempted to save her had the horror of seeing her burn to death.

"The accident appeared to have been caused by the enormous velocity of the train when coming to a cross rail. The first locomotive ran off, and striking against the bank one of the axletrees broke, and caused the sudden shock which had proved so fatal. This locomotive, I understand, (for I was too much agitated to examine it,) was only on four wheels, whereas most of the locomotives on this road have six. If there had been six wheels to this locomotive it would have still run on; probably the shock would have been less sudden and disasterous. Certainly if the abominable practice of putting an impelling engine behind had not been adopted on this occasion, the consequences would have been far less extensive. Two of the strokers were, I was told, killed, and McGeorge (an Englishman the superintendent, a most valuable servant to the company, who was with the train, was also reported to have been killed.'

"*A quarter to five.*—The number of bodies taken to the Morgue is now stated to be twenty, others say as many as forty. They are in such a state as to be scarcely recognizable. The number interred at the Cemetery of Mont Parnassee is said to exceed thirty. Several wounded persons, many of them so injured as to leave no

hope of recovery, have been landed by the St. Cloud steamer. There is, therefore, every reason to believe that the number of killed and wounded really exceeds one hundred. If the persons who were in the first three carriages were nearly all killed, as my informant from Meudon reports, the number of killed alone must have exceeded eighty. I still hope, however, that the number may be smaller; but that forty or fifty have been killed, and double that number more or less grievously wounded, seems to be the general belief. At the hospital Neckar, more than thirty wounded have been received during the day.

"During the sitting of the Academy of Sciences M. Cordier communicated various details of the accident, extracted from an official report addressed to the Minister of the Interior by Messrs. Combes and De Senarmount, the engineers of mines, charged with the inspection of railroads. In addition to the facts already known, it states that the foremost locomotive was a small one with four wheels made by Sharp and Roberts. The boilers of both are at present without the slightest injury. According to the testimony of the Commissary of Police at Meudon one of the carriages was altogether consumed in ten minutes. The report attributes the accident to the use of the small locomotive, and recommends that such machines should not for the future be employed. The Academy listened to the account in mournful silence. Several members afterwards made remarks on the inconvenience of using locomotives with four wheels. Mr. Elie de Beaumont particularly protested against immense trains being drawn by several locomotives, the danger increasing in proportion to the number of machines employed. The custom of locking up the passengers was also much spoken against."

"Every thing has been done in the way of inquiry and remedy that the lapse of time has allowed. The official proceedings and regulations and the scientific studies and conclusions will be instructive and practically beneficial for all countries. The adminstrators of the railways of the right bank of the Seine publish this day a series of new and very minute precautions which they have adopted in consequence of the public dismay. They announce that their two roads of St. Germaine and Versailles have carried, since their opening nine million of passengers, without fatal or serious accident, and the Bergian railways, from the 5th of May, 1835 to December, 1841, nearly twelve millions, with the loss of only three lives; and that the French and Belgian cars have run altogether in that transportation nearly

a million of post leagues. As a set-off to the St. Phillip catastrophe, the loss of life and the maimings by vehicles in the streets of Paris is computed and arrayed. It is a fearful record which will not be diminished by the extension of wood pavements."

Several years since we gave an account of the marvelous process by which Signor Sigate had succeeded in mineralizing flesh in such a manner as to retain the color and form unimpared. Since that time we have conversed with a gentleman who examined the collection which he pronounced most curious and wonderful. The following extract from Dr. Mott's travels contains a somewhat detailed description of this singular collection.

CHEMICAL PROCESS OF PETRIFYING HUMAN FLESH.

"The most novel and piquant treat of all others to me in the beautiful capital of Florence was my several visits to signor Sigate, a scientific gentleman possessed of a wonderful art unique and unknown to all the world besides. Incredible, if not marvellous, as it may seem, he has discovered a chemical process by which he could actually petrify, in a very short time, every animal substance, preserving permanently, and with minute accuracy, its form and internal texture and in such a state of stony hardness that it could be sawed into slabs and elegantly polished.

"He had in this way formed a museum of various animals, such as frogs, fishes, toads, snakes, and a great variety of parts of the human body in a natural and diseased state. In my presence he threw the human liver, lungs, heart, and other parts thus petrified, about the flour with perfect impunity, and without the least injury being done to them. Still more curious, he had with Italian taste, cut them into small pollish squares, and arranged them in complete table of mosaic work! so that it gave him as much delight as it did me astonishment to find that I could with my finger designate to him, on this precious centre-table for a surgeon's drawing-room, the appropriate name and character of each individual object that spread out before me in a pathological chart of real specimens.

"Thus a pulminary tubercle or ulcer here, a hydatid of the liver there, a cicatrix in the brain in another compartment, and a calculus in the kidney, or ossification of the heart's auricles and valves in a fourth. It struck me that, for all anatomical and surgical purposes and all objects of natural history, this was an art of inappreciable value, and the most desirable ever discovered; and with

that view I conversed with him relative to a visit to our country, believing it would be of national importance if we could have the benefit of his services.

"I even entered into some preliminaries of a negociation with the design of obtaining him for my own purposes, but I found him sadly involved in debt, and that his demands were too exhorbitant to be complied with. I, however, made liberal offers, and did not entirely despair that he would have acceded to them, when, to my regret, about three weeks after we left Florence, I was informed by a letter, that he was suddenly attacked with a violent inflamation of the lungs which proved fatal, and what is as much to be deplored, that his unprecedented discovery died with him. He never would divulge the least part of his marvelous process, but when pressed by me on the subject, hinted that he had acquired it in his various journeys in remote Eastern countries; and it is fondly to be hoped some one may ere long appear who, in persuing this inquiry, will be enabled to recover the art among those people from whom he intimated he had obtained it. It is worthy of observation, how, in this extraordinary process, art accomplishes in so short a time, what nature requires so long a period to effect, and then never with any thing comparable to the perfection, we may say almost identity, with which this mode preserves an exact fact similar of the original; in truth the original itself. In this surprising and almost magic art not only, as we have said, the exact exterior outline is faithfully and exactly represented, but also the most minute and delicate interior arrangement of structure admirably perpetuated; as for example, the entire viscera of the chest and abdomen, with all their varied and beautiful convolutions, were clearly exhibited, retaining even the colors of the blood-vessels in preparations of frogs, birds, and other animals, besides the human body."

Dr. Mott's Travels.

The following article from the Boston American Traveller gives some idea of the manner in which railroads are destined to contribute to the luxuries as well as the comforts and necessities of life, We are glad to find that the directors of the Western railroad understand the art of converting the whole country into a garden for our great cities.

A little ingenuity expended in this manner may contribute greatly to the usefulness of railroads.

FREAKS OF RAILROAD TRANSPORTATION.

"Three thousand *wild pigeons*, from *Michigan*, arrived in this city, on the 25th nst. alive, over the *Western Railroad.*

"1,500 bushels of *wheat* were, last week, *bought in New York city*, carried up the North river to Greenbush and thence sent to Sutton, near Worcester, *over the Western railroad.*

"We understand that the Western Railroad are about preparing *refrigerator cars*, in which *fresh beef, pork, veal, poultry, pigeons*, venison, wild game, and *other fresh meat* can by a moderate quantity of ice, be kept in *perfect order in the heat of summer*; and in which (in winter) they can be *kept from freezing;* thereby, in either case, *adding much to the value of the article*, when carried to market.

"These *refrigerator cars* will be used, for the like advantageous purpose, to carry eggs, butter, lard, *fresh fish, oysters, lobsters, vegetables* cheese, lemons, oranges, strawberries and *all berries and fruits and roots:*—being a mode of transportation of great value, for nice delicacies, which bear a good price.

"We also learn that it is contemplated that these refrigerator cars shall go with the passenger trains, *in twelve hours, through* from Albany to Boston; and shall be placed between the tender and the passengers cars, giving additional security to the passengers, in case of accident.

"If our Michigan and Ohio friends will put, in refrigerator cars, the fresh meat and the wild game they intend for this market, they can send their cars to Buffalo on the lakes; and from Buffalo to Greenbush, partly by railroad and partly by canal, or wholly by the Erie canal. Then from Greenbush, it can come to Boston quickly and in perfect order, the moment the system now proposed is perfected. In like way, a chowder of fresh Massachusetts codfish will readily be obtained at Chicago.

"It may be asked "what is a refrigerator car?"—It is simply a common car, with a hole at bottom, which you stop by a spunge, that spunge allowing the water to drop down, while it impedes the air coming up into the car. Then you have four inches of powdered charcoal on the sides and top and bottom of the car compactly, between the two boards, which form each of the sides, as well as the top and bottom.

"If it be said that it is difficult to make so large a refrigerator, as an 8 wheel car will be, we need not only reply, that the ice-houses at Fresh-pond, are, in fact, large refrigerators, and that some of them are large enough to contain 8,000 tons of ice, and have kept ice from melting for a whole year and longer too.

"In sending a cargo of ice to Calcutta, we so arrange the hold of the ship, as to make it virtually, a large refrigerator; and we do this so efficiently, that, crossing the equator twice on her passage, and being for a long time in the warm water and under the burning sun between the Tropics, she yet wastes scarcely any of her cargo. *Barrels of apples kept cool, in this refrigerator, arrive in Calcutta from Boston, in the most perfect order, and command a great price.*"

The Earl of Rosse hitherto known as Lord Oxmanton, has commenced the construction of an enormous telescope far beyond any thing ever yet attempted This nobleman possesses what are not often united great scientific knowledge and much money. We understand that from the great size and brittleness of the speculum, it will require two months to complete the annealing process in an oven built expressly for the purpose. After all the experiment is rather one for ascertaining the extent to which human ingenuity can carry the size of the telescope than for any specific application, as the limit of usefulness determined by Herschel was below forty feet focal distance.

"*The Earl of Rosse's Telescope.*—The following account of the speculum metal of this Leviathan Telescope, we extract from a letter from Sir James South, a distinguished Astronomer, to the Editor of the London Times. The Telescope receives its name from the Earl of Rosse, near whose castle and under whose directions the works are conducted.

"The metal is 6 feet diameter, it is 5 1-2 inches thick at the edges, and 5 inches at the centre; its weight is about 3 tons.

"By grinding and polishing, its thickness will probably be reduced to 1–10th of 1–8th of an inch—it will be formed into a telescope of 60 feet focal length, and will, there is every reason to hope, be actually in use this year.

"The speculum will have a reflecting surface of 4071 square inches, whilst that of the telescope made by the immortal Herschel, under the auspices of King George III. had but 1811.

Observatory, Kensington. J. South.

"By the following from the Lancaster Intelligence and Journal, we are pleased to see that Mr. Herron, has had an opportunity of making trial of his improved Railway, and that the trial has resulted so favorable to its reputation."

IMPROVED RAILWAYS.

"The subject of improving the construction of railways in our country has not, hitherto met with that attention, particularly from those

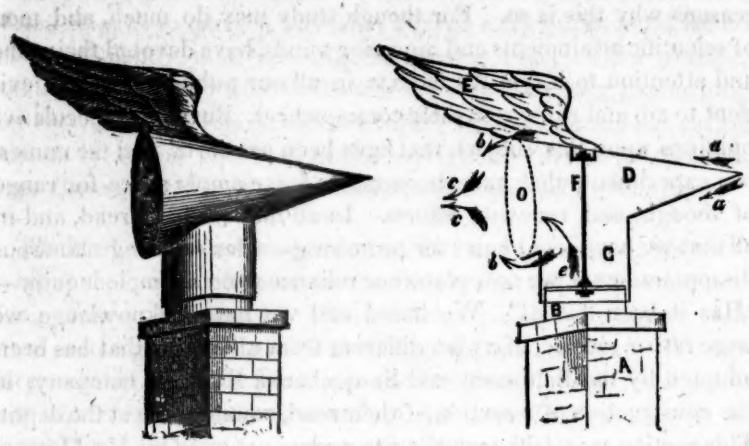
who are interested that it deserves. There are certainly very plain reasons why this is so. For though study may do much, and men of scientific attainments and inquiring minds, have devoted their time and attention to it, yet the defects in all our public tracts are evident to all, and ruinous in their consequences. But all the speculative opinions upon this subject, that have been put forth, and the numerous experiments that have been made, leave ample space for range of thought and renewed efforts. In all that we have read, and in all that we have seen, however promising—after suffering numerous disappointments, we now place our reliance upon a simple inquiry—"Has it been tested?" We heard and we must acknowledge we were rather sceptic, of a plan different from all others, that has been adopted by the Baltimore and Susquehanna Railway company, in the construction of a section of their road, commencing at the depot. This section was laid according to a plan patented by Mr. Herron, civil engineer, and has been in opperation for upwards of two years. The matter had entirely escaped the memory of the writer, but was brought vividly and in a very interesting manner to his attention, by the following paragraph, which appeared in the Baltimore Patriot of the 23d inst:—

"*The improved Railway track.*—Two years ago a portion of Railway was constructed near the depot of the Baltimore and Susquehanna rail-road in this city, according to the patent trellis system devised by James Herron, civil engineer; and is now (having withstood the breaking up of two winters' frost) in *as perfect order as it was the day it was laid down*, although it has not received the slightest repair. It costs *less* than the old defective system of construction. These facts ought to arrest the attention of all concerned in railroads, and may be verified by reference to Charles Howard, Esq. the enlightened President of the company, who was the first to afford an opportunity of testing the new improvement.

"This short notice was sufficient to excite a desire to become more intimately acquainted with a plan which has given such unqualified satisfaction, after a lapse of time sufficient to detect defects if any existed, and thus I had an opportunity afforded by the reception yesterday, of a neatly printed quarto, entitle a practical decription of Herron's patent trellis railway structure," etc. illustrated by engraved plans, with ample explanations, cost of materials, etc.

"It is my intention, as soon as time will permit, to give a short review of the work, in which I shall endeavor to set forth some of the peculiar claims which Mr. Herron's plans have to the particular consideration of all who are concerned in the construction of railways.

ESPY'S PATENT CONICAL VENTILATOR.



We are happy to learn that this important invention has at last attracted the attention of our government, and is gaining popular favor throughout the community. The inventor, James P. Espy, Esq. well known in this country and in Europe, as the discoverer of the "law of storms," it appears is reaping a richly-deserved harvest for his genius and pesevering enterprise. His apparatus has already been employed for ventilating several of our ships of war, as well as the public buildings at Washington, and answers every desired expectation. It is well adapted to the purpose of ventilating public buildings, ships, kitchens, cellars, cisterns, vats, mines, stables, etc. Also for producing a strong draft in chimneys (and thereby prevent their smoking,) flues to steamboats, locomotives, and a multiplicity of other purposes. It may be described as follows; reference being had to the letters in the above diagram, which represents a vertical section, and a full view of the ventilator attached to a chimney:—

A, denotes a chimney.
B, a sheet-iron pipe, secured upon the top of the chimney.
C, a sheet-iron collar, fitting loosely over the pipe B.
D, a hollow cone, made also of sheet iron into which the collar
C, enters.
E, a vane, to keep the cone pointed to the wind.
F, a spindle, on which the apparatus revolves.

The arrows *aa*, *bb*, *cc*, and *e*, indicate the direction of the currents fo air. Suppose the wind to blow in the directon of the arrows *aa*, it will pass along the surface of the cone, from its apex to its base, where it will converge as represented by the arrows *bb* and *cc*, and produce a partial vacuum at O, the mouth of the cone, and consequently a strong current of air will rush up the chimney A, in the direction of the arrow e.—*Hunt's Merchant's Mag.*

[From the Civil Engineer and Architect's Journal.]

MR. VIGNOLES' LECTURES ON CIVIL ENGINEERING, AT THE LONDON UNIVERSITY COLLEGE.

Second Course—Lecture 1.—*Railways.*—Mr. Vignoles commenced by saying, that, in pursuance of the order stated in his introductory lecture, he would proceed to investigate the principles upon which railways should be laid out under varying circumstances. In calculating the power (of whatever description it may be) necessary to overcome the resistance of a load to be moved on any railway or road, it may be divided into two parts—viz. that necessary to overcome gravity, and that required to meet friction. The former is, of course, common to, and equal on, all descriptions of roads deviating from the horizontal line, and is in proportion to the sine of the angle of inclination; the latter is regulated by the degree of perfection of the road, and of the vehicles moved upon it, and includes the resistance of all obstacles to the rolling surface, or periphery of the wheel, in addition to the axle friction due to the load or weight placed upon the carriage. It has been assumed, from experiments and observations, that the average friction upon a railway is 9 lbs. per ton, and that this continues the same at all velocities; but there is reason to believe that the latter part of the assumption must be much qualified. The gravity due to the inclination of the plane being added to, or subtracted from the friction, as the plane rises or falls, the sum, or difference, will give the total amount of power necessary to overcome the resistance of the load. The power necessary to overcome the gravity being expressed by the proportion which the rise of the plane bears to the weight to be raised, (say, for example, a ton,) is found by dividing 2240, the number of pounds in a ton, by the denominator of the fraction which expresses the inclination of the plane; thus, on a plane rising one foot vertically in a horizontal distance of 1000 feet, the fractional expression is $\frac{1}{1000}$ and the power (retarding or aiding the load,) will be the thousandth part of a ton, or $2\frac{1}{4}$ lb. It is evident that, as we arrive at steeper inclinations, this power will at length become equal to that required to overcome the friction; thus, on an inclination of $\frac{1}{250}$ it will be $\frac{2240}{250}=9$ lb. per ton, and this being subtracted from the friction, on a railway which is commonly taken at that same amount of 9 lb. per ton, it results that no power is required to move a load down such an inclination, or wherever the gravity and friction are equal, and balance each other. The angle that such an inclination makes is called the angle of repose, but will, of course, vary with the friction due to various descriptions of roads and vehicles. On steeper inclines than such, not only is no power wanted, but there is a gravitating power due to the descent of the plane, and so strongly does this act in steep inclinations, that it is necessary to put on the break, to retard the velocity which it occasions. It is found, however, when a train is allowed to descend a steep plane without retardation, that, owing to the resistance of the air, it will, after acquiring a certain velocity, cease to be further accelerated; many theoretical writers have fallen in-

to error, by supposing it dangerous to allow trains to descend inclinations steeper than the angle of repose without applying the break. On railways where there are inclined planes of $\frac{1}{100}$ for several miles together, the trains often commence the descent at the rate of upwards of forty miles an hour, and the speed, instead of being accelerated, has been quickly reduced to little more than the thirty miles an hour, or to such uniform velocity that a railway train will acquire on that inclination, varying a little with the weight of carriages, or the length of the train; such being the case, it is evident that lines of railway for locomotive power, can be safely laid out with inclinations of 1 in 100, and even steeper.

It is of the utmost importance, in laying out a line, to consider the power which is proposed to be employed, and the mode of obtaining it; thus, if it be intended to lay out a horseway to carry coal from a collery to a shipping place, the line should be made always to descend, and so regulated, that the number of full wagons that may be sent down be that number which may be taken back empty. But horse-power being extremely limited, recourse is had to steam, and the locomotive steam-engine has been applied to railway travelling, as being better suited to the purpose than animal power. The power of the locomotive engine may be defined, not so much by horse power, or cylinder power, as by boiler power, or capability or rapidly supplying steam to the cylinders, and still more by adhesive power, or the weight insistent on the driving wheels, so as to have purchase, as it were, to drag the load after it, for the wheels will slide, more or less, and, under some circumstances, will merely turn round on the rails, without progressing.—Many lines appear to have been laid out under the impression that the locomotive engines would always have to carry a *maximum* load, and, in accordance with this principle, and to enable them to do so, it was some short time since laid down as an axiom, that no inclination should exceed $\frac{1}{330}$ and that gradients should be constantly uniform through the whole length of the line. Experience has shown, however, that the practical cost of conveyance of ordinary trains over lines greatly varying in their gradients, does not materially differ, the wear, and tear, and fuel, seldom being increased so much as 10 per cent., and the other expenses and contingencies being the same, whatever the gradient of the railway, the difference on the whole expense of working and maintenance becomes very small indeed. In laying out a line, then, the traffic must be considered quite as much in the distribution of it as in the totality; for it is evident that, to accommodate the public, the trains ought to go often, and will, therefore, generally be light; and when we consider the great economy in construction, and the little additional expense incurred in the afterworking, we may conclude that railways may be advantageously laid out with much steeper inclinations than they have in general hitherto been, particularly in the remote districts, where the railway system has not yet been extended. A powerful engine will draw an immense load on a level, whereas it often has not more than twenty tons to draw—consequently, gravity ceases to become an object; and even should the

traffic increase in course of time, it will be better to send frequent and light trains than, in the original construction, to incur heavy cost to graduate the road for heavy trains, which are seldom to be carried. This principle must, of course, be confined within certain limits; thus, lines may be laid out with better gradients, where the traffic is very great, and will justify the expense and inconvenience which might result from an engine having always to go up a steep ascent. Railways in England have cost, on the average, £30,000 per mile, and the first cost of locomotive power does not amount to one-fifteenth of that sum. The interest on the capital is, therefore, very great, while that on the power is small, as is also, comparatively speaking, the daily cost of transit due to the power only. If these proportions were different, the latter being increased, while the larger amount (the interest on the cost of the works) were diminished, the capital sunk in railways might have been reduced fully one-half, with equal satisfaction and benefit to the public, for whose use they were designed, and with greater profit to the shareholders.

Lecture II. Railways—Locomotive Power.—In the last lecture it had been stated that the adhesive power of the locomotive engine depended upon the weight borne upon the driving wheels.—The greatest amount of adhesion of iron upon iron, according to the experiments of the eminent engineer, Mr. George Rennie, as published in the Philosophical Transactions, appears to be about one-sixth or one-seventh of the weight of the insistent load. In the locomotive engine, where the bearing of the wheels is upon smooth surfaces, the adhesion will, of course, be less; and in weather when rime or mist congeals upon the rails, it is very small indeed, sometimes none at all. But in ordinary states of the rails, and of the atmosphere, one-fifteenth may be taken as an average. The vicissitudes to which this power is subject, will often account for the varying rates of railway travelling, and it is only when the resistance of the load is less than the smallest amount of adhesive power which the state of the weather or the rails will admit, that the time of transit of a train over any given distance can be insured. Now, the usual weight bearing upon the driving-wheels of an ordinary locomotive, for passenger traffic, is about seven tons, or 15,680 lb.; one-fifteenth of this will be 1042 lb., or, in round numbers, say 1000 lb., for the average available adhesive power of such an engine for moving a load, and on the amount of this alone will depend the weight which the locomotive engines can draw after it. The other principal element which must be taken into account in the locomotive engine—viz. the speed—will depend mainly upon the power of the boiler to generate steam with sufficient rapidity. A boiler may have quite sufficient power to move (at a velocity of three miles an hour) a load of which 1000 lb. shall be the representative, but it must be of a far superior description. and far higher powers, to move the same load at a velocity of thirty miles an hour; and this subject does not appear to have been sufficiently considered, though it is of such paramount importance

thoroughly to understand the nature of the moving power to be used, before going into the subject of the gradients, or the principles of laying out the line. The amount of the load, then, which the engine can draw, will depend chiefly on the adhesion, and the velocity will depend on the boiler where the stream is generated, the cylinders being proportioned to each of these two other regulating powers. And not only must the steam be generated to a given pressure to produce that power, but with sufficient rapidity to continue it; and keeping up a high velocity, it must be, as it were, rammed into the cylinders, so as to produce the greatest possible effect in the least possible time, and this is the reason why high velocities are so very expensive, as the same effect might be produced by one-fourth the quantity of steam, if sufficient time were given to expand it. But there is yet another circumstance that modifies the amount of adhesion—viz. the inclination of the road. It is manifest that, if the road were vertical, the engine could have no adhesion upon the rails; and, therefore, between the perpendicular and horizontal lines, the power must undergo many degrees of variation, quite independent of the atmospheric cause already mentioned. We have no experiments to determine the ratio of that variation, but reasoning from analogy, it may be assumed to be the sine of the angle of inclination, or in the same proportion as the resistance arising from gravity, so that practically the diminished amount of adhesion, on any inclined plane, might be found by deducting the resistance of gravity on that plane from the constant of 1000 given above; thus, on an inclination of 1 in 100, the gravity of the engine per ton (or 2240 lb.) will be $\frac{2240}{100}=22{\cdot}4$ lb., and that for seven tons will be $22{\cdot}4\times7=157$ lb., which, subtracted from 1000, will give 843 lb.= the diminished amount of adhesion, which will be the limit of the power of the engine on that incline, as regards the load, no matter how great the boiler or cylinder power may be. And to find the load which this power will draw, we must take the sum of the resistances arising from gravity and friction for one ton, and the adhesive power divided by this sum will be the amount sought in tons; on an inclined plane of 1 in 100, the calculation will be found thus:—Friction 9 lb. per ton, *plus* gravity as before, $22{\cdot}4=31{\cdot}4$ lb., and adhesive power 84·3, divided by $31{\cdot}4=26{\cdot}7$ tons, which is only one fourth of what might be drawn on a horizontal line. Hence the advantage of heavier engines, which are daily coming into use, as also the property of coupling the wheels of engines for drawing heavier loads up steep inclines, and by this means the whole insistent weight of the engine is rendered effective by adhesion, and the load the engine can draw after it proportionally increased. In calculating the amount of resistance of a load upon a railway, the friction had been assumed to be 9 lb. per ton, rather in deference to general opinion than otherwise; it was probably much higher. It is considered that the friction of the engine and engine gear is 16 lb. to the ton, but that of the lighter carriages less; however, if this number (9 lb.) should be proved incorrect by future experiments, the principle of

the calculation will not be altered, and it will only be necessary to substitute for 1000 whatever number shall be found on closer investigation to be nearer the truth.

The power generated in the boiler, and applied in the cylinders, now remains to be brought under consideration. This may be stated to be the capability of the boiler to supply steam of high pressure, to enable the piston to perform a given number of strokes per minute, which accordingly will be one of the essential elements in computing the power of the engine; and therefore it is that we are always unwilling to define it by any number of horses' power, since it is clear that the engine which, moving at the rate of 15 miles an hour, would be called a 20 horse engine, would be styled a 40 horse engine when moving at the rate of 30 miles an hour, all other circumstances remaining the same. But it does not follow that, because the number of strokes per minute be increased, that the power available for locomotion be increased also, and in this consists the essential difference between locomotive and stationary engines, for in the former there are circumstances, as before shown, which circumscribe that power, over which the boiler has no control; and, as regards the locomotive engine, a third point must be taken into consideration. It is a well known theory, that, if a metallic substance be in contact on one side with water, and that heat be applied to the other, that once the body becomes thoroughly warmed, the caloric will be taken up by the water with as much rapidity as it can be supplied to the metal. Now, in the locomotive engine, there is an immense area of heating surface in contact with the water in the boiler, in consequence of the numerous tubes which pass through it from the fire-box to the chimney, and it is on this principle that what is called the steam draft has been introduced, by which means the caloric is rapidly drawn from the fire through these tubes, and as rapidly absorbed by the water with which they are in contact, for the production of steam. It is evident that, in proportion to the rapidity with which the piston moves, and with which the waste steam is injected into the chimney, will the heat be absorbed by the water from the tubes and steam generated, the effect of which is, that the faster the engine goes, the quicker it generates the steam; and this forms another great beauty and peculiarity in the locomotive engine. The principles of calculating the moving power being thus explained, the way has been sufficiently cleared for entering on the subject of the laying out of railways.

Lecture III.—After recapitulating a few of the leading points which were stated in the last lecture, the professor called particular attention to the formula whereon he had based the calculation into which he had then entered, and he now exhibited tables and diagrams in further illustration. The adhesive power of 1000 lbs. was assumed as the average of what a locomotive engine will have in all states of the weather, and of the rails; but if the wheels be coupled, or the insistent weight otherwise increased or diminished, the adhesive power (on which depends the load) will be altered in

the same proportion, subject also to variation from the state of the weather and the road, and undergoing the stated diminutions from the effects of gravity on all planes which depart from a horizontal line, the velocity of the train depending on the evaporating power of the boiler. But in the stationary system the engine winds (upon a roller, or over a sheave or wheel) a rope supported by pullies, placed at regular distances along the road, and to which rope the train is attached. Mr. Vignoles stated that the student may refer with confidence for every information on this subject, to Mr. Wood's *Treatise on Railways*, and commented on the extracts he made from that work.

Atmospheric Railway.—There is also another mode of applying the stationary engine to the purposes of locomotion, by producing through an air pump a partial vacuum in a pipe, thus making atmospheric pressure the moving power; and it may be interesting to state, that the scientific men who were appointed by the railway department of the Board of Trade to inquire into the system of the Atmospheric railway, had fully recognized that principle, and concurred in considering that the experiment contemplated upon the Dublin and Kingston railway extension, and recommended by the directors to the proprietors, as applicable for illustrating the principle on a large scale. On the atmospheric railway the diameter of the pipe or tube regulates the load, but the velocity depends almost entirely upon the diameter of the air pump that exhausts the pipe, the rule being that the area of the air pump must be made as many times greater than the area of the pipe, as the velocity of the train is to exceed that of the piston of the air pump. Thus, if the piston of the air pump be supposed to move at a rate of three miles an hour, and it be required to move a train at a velocity of thirty miles an hour, the area of the air pump must be made ten times the area of the pipe; the diameter will, of course, be deducted from that area. Now, it appears that the most economical pressure in the pipe (which is what engineers must chiefly look to,) is about 7 lb. to the square inch, or rather less than half a vacuum; therefore, this may be taken as the constant of the atmospheric pressure; and if we multiply this constant by the area of the travelling piston in inches, we shall obtain the effective pressure upon that piston, which, as it regulates the load, may be said to correspond to the adhesive power in the locomotive engine, but which, unlike that power in the locomotive, will be undiminished on inclined planes. Again, if we divide this power by the friction (which was before taken at 9 lbs. to the ton,) we shall obtain the number of tons which the piston, acted on by the atmospheric pressure, is capable of propelling. Thus, supposing we have a pipe of 14 inches diameter, if we multiply the area of this pipe by 7 lb., we shall find the effective pressure equal to 1078 lb., which divided by the friction, 9 lb. will give about 120 tons—the weight which can be propelled by means of a pipe of that diameter; and if the piston of the air pump move at the rate of three miles an hour, and its area equal to seven times that of the pipe, the load

will be moved with a velocity of twenty-one miles an hour, and it may be demonstrated that, on ascending and descending planes, the speed, although increased or diminished at first, will soon become uniform. Of course, upon the diameter of the air pump will depend the power of the engine which is to work it. The calculations in this case will be similar to those for an engine required to work ropes—in the one case it being required to find what is wanted to overcome the resistance and friction from ropes, pullies, etc., and in the latter to find the power to work the air pump, and exhaust the air from the tube at any required velocity.

Inclined Planes.—The Professor then recurred to the effect of trains descending inclined planes. Mr. Navier (in his work, translated by Mr. M'Neill, which he mentioned as a text book on the comparison of different lines of railway,) differed somewhat from the propositions he had laid down; it was therein stated, and Professor Barlow concurred in the statement, that an engine and train did not gain any advantage in descending planes steeper than a certain inclination which they have put as the angle of repose.—Now, in practice, Mr. Vignoles did not find it so, but, on the contrary, daily experience proved that, as far as inclinations of sixty feet in a mile, the trains may, under almost all circumstances, have the full benefit of gravity in the descent. Proffessor Barlow has laid down, in several important works, which from their high standing, will have a material influence upon the public mind, that though additional power be required to surmount steep inclinations, yet, so far from gaining a corresponding advantage in the descent, there will result rather an injurious effect from the necessity of applying the break. Now, it has been already mentioned, and experiments have been repeatedly made by Mr. Wood, Dr. Lardner, and others, showing that, when engines descend long inclined planes, such as those on the Croydon railway, the application of the break is seldom necessary, the speed that would be due to the accelerating force of gravity, being reduced by the resistance of the atmosphere, until it setttes down to a uniform and safe velocity. It is evident, therefore, that there is a great deal yet to learn on this subject, when we find authority and practice differing so materially. Mr. Vignoles observed, in conclusion, that, as the laying out of the lines of railway ought to be strictly regulated by the power to be used for locomotion, as well as of the load of each train, and the nature of the traffic, it becomes interesting to consider these principles in respect of the extension of the railway system in this and in other countries; for, looking at the enormous outlay hitherto incurred, lines through remote districts would not be undertaken, unless the first cost of railways, and the annual expense of working and maintaining them, were reduced to a *minimum*.

RAILROADS FOR THE TRANSPORTATION OF CATTLE AND MARKETING.

In a previous communication, we give an extract from the Franklin institute relative to Emperor Leopold's raiload from Vienna to Brunn, to show the important fact of a railway being projected

and constructed mainly for the supply of Vienna, the capital of Austria, with beeves from a particular district.

We find also the most distinguished and careful capitalist of Europe the Baron Rothschild, soliciting the privilege of constructing this road, and subscribing with his associates $7,000,000 to effect the object. It leades us to the conclusion, that if our capitalists will investigate the subject, they will seek investments in "*railways judiciously located between desirable points*," in preference to bank or other stocks, and to quote from the London bankers' circulators, consider it a permanent investment, equal to productive real estate—"*a valuable property*, which may now be set, down as being *permanently established*."

To our citizens who have witnessed the daily large arrivals of calves and lambs, from the towboats, to be placed in pens on our wharves without food and withont even water, for from not less than 24 to 72 hours, from the time they are first taken from their mothers milk, then to be piled in carts for the slaughter house.—the sight is cruel and revolting. This is not all: the feverish state in which these animals are killed, makes their flesh tough and stringy, with a disposition to early putridity, and with the poor, who are obliged to buy cheap meat, this is often the cause of disease, and thus indirectly, is a tax on the rich.

The epicure and good housekeeper will look for, and pay an extra price for "Long Island Veal," to be sure of its freedom from the taint alluded to. Again if from any cause, and it often occurs, an extra supply of fat cattle is thrown into our market, the barren pastures around Yorkville receive them, literally to starve, until the butcher's knife relieves them from their sufferings.

From the present period of the year, and for several months, it is uderstood that we receive from the rich pastures of Putnam and Dutchess, about 300 head per week of young early grass fed beef. It would be ample remuneration to a railway, to transfer these cattle daily as wanted at $2½ per head, and calves and lambs at 10 to 25 cents each, for a distance of 75 to 100 miles. The farmers on the line, in districts, would soon club, and own their *market cars*, in which they could bring to this city, their poultry, milk, butter, chesee vegetables, etc. Each car would via market, run out to its proper *sidding* or *turn out* in the Bowery, or in our avenues, under city regulations.

Refrigerator cars, a late invention on the western railway, would present to us luxuries in "fresh printed butter," that would settle this long contested question of rivalry with the city of Brotherly Love, cream and delicate fruits, that we have no idea of at present.

We are still in our infancy applying the railway system to the *regular supply* of large cities, with their daily wants, and let us add, in relieving them from their street manure, at a handsome profit, to renovate the lands from which we receive our supplies.

Imagine for a moment the introduction of a wide 8 wheel car, 30 feet long, with its cooking stove, sleeping rooms and 24 berths as commodious as the farmer now enjoys in the Poughkeepsie tow boats. To this *moving hotel*—to be in numbers proportioned to the

market districts—let there be added the *market cars*, with their three decks, each deck arranged for its particular use. Poultry, with its several divisions, oxen, sheep, lambs, calves, milk, etc., in the same way, to accomodate this new channel of trafic with our city. Let our councils establish a part of the Bowery (none better than that abandoned by the Harlem Company,) canal street, or on the 3d, 4th and 6th avenues, into which the several trains can be run, on their arrival at 5 in the morning in summer, and daylight in winter to occupy their stations until 10 o'clock, A. M., when the whole would take the return train, and thus the farmer will be with his family in the evening, ready to return the next morning, after having traversed a distance of 100 to 150 miles with every comfort that can be desired.

It is true that these arrangements might not be popular with a certain class for a short period, but it would soon be found to work well. The thrifty citizen would buy his marketing cheap. The less active would take his supply second hand, not third, at our groceries.

This class of traders would clear out the farmer of his supplies before 9 o'clock. This is not all, the industrious huxter and market woman would penetrate into the country, and there make their purchases on advantageous terms, and thus cheapen the market.

We may continue this hasty sketch, to show the profit and *incidental advantages of railways to a growing city.* We cannot close our remarks without adverting to the practical effects of only completing 46 miles of the Erie railroad, to Goshen, and to the lines of railways coming into Jersey City, to give testimony in their favor, to all those who will attend the arrival of the steamboats at their depots.

In Boston, it is well known that by the construction of railways into the country, the price of milk was reduced 50 per cent. This is certainly a great blessing to the poor, and which they well know how to apperciate, in raising a family of children.

Within four to six hours distance from this city—say 60 to 100 miles—milk can be taken from the cow, reach this city in better condition by the railways, than we now receive it by carts, eight to ten miles. We know, from accurate data, that milk is not now worth one cent per quart to the farmer of Dutchess county to make butter.

It is not generally known that the demand in this city for milk (with a scanty supply) exceeds 30,000,000 of quarts per annum at even the present high prices. The saving of only one cent per quart on this amount would yeild $30,000 per annum, a sum sufficient to yield an income of 10 per cent on the cost of a railroad to Albany and Troy.

The last week market wagons were in abundance in Burlington, N. J., offering their peas to the New York accents at from 2 to 2 1-6 per basket—to be sold here at 6 to 7. But for the railway to Camden and Cloucester county, our markets would have but a very irregular and inadequate supply of early fruit and vegatables. It is well known that the poulterer, in the fall and winter, extends his trips even to Harrisburgh, in Pennsylvania. So soon as we can con-

nect with the Western Railroad in Columbia county, we shall then have upwards of 1,000 miles of railway tributary to this city.—*N. Y. Standard.*

THE PROGRESS OF THE WEST.

St. Louis and its Trade.—We recently alluded to the wonderful progress of St. Louis. We have since been furnished by the St. Louis Chamber of Commerce with much valuable statistical information in relation to the growth of that city and the western country generally. In 1830, the population of St. Louis was 5,852. It is now rising 30,000, During the year 1841, 30,000,000 of bricks were made in the city, 25,000,000 of which were sold and used in that place. There are 9 steam saw-mills there, 3 mills for planeing boards, 2 white lead factories, 3 oil mills and 6 flour mills. The first Insurance office was established in 1831. There are now 7 officers, the total marine risks of which amount to upwards of $58,000,000. In 1841, the receipts of lead from the Galena mines, amounted to 425,000 pigs valued at more than $1,000,000. The growing crops of tobacco, will, it is said, range at from 12,000 to 15,000 hogsheads. The importation to St. Louis, of cloths, blankets, etc., intended for the American fur trade, is set down at $225,000 per annum, and the exports and home consumption of buffalo robes, peltries, etc., at $500,000. The American Fur Company employs several steam and other boats, and several thousand men. Their boats, at least once a year, ascend the Missouri to the mouth of the Yellow stone. Hemp is another staple of Missouri. It is estimated that the crop for 1842, will in Illinois and Missouri, amount to not less than 10,000 tons. This hemp is worth $200,000 in a raw state. But the most valuable exports from St. Louis and the country connected with it, are bacon, pork and lard. During the present winter, 47,000 hogs were slaughtered at Alton and 10,000 at Peoria; while it is said that the Illinois river, with the Alton trade send out annually, not less than 8,000 tons of pork. The value of this item alone, is given at $1,500,000. Flour and wheat are also important items, and show an annual aggregate of nearly $1,000,000. About 1,500 horses, 2,300 mules, and 6,000 head of cattle, were shipped during 1841 to the south. The imports are estimated in 1841, at $20,000,000.

These are but a few of the facts grouped together by the Board of trade, but they are calculated to convey a forcible impression as to the onward progress of the west. It is estimated that in 1841, $15,000,000 in exchange were sold in St. Louis. Last year, the number of steamers on the Mississippi and its tributaries was 437, about 150 of which were employed in the St. Louis trade, during the whole or a great portion of the year. As more fully illustrating the character of the trade at this point, we subjoin the report of the Harbor Master of St. Louis, for the last three years, including all the items embraced in his return, viz:

Whole number of arrivals of steamboats for the year 1839,	1,476
Amount of tonnage,	213,193
" " lumber,	10,099,516
Cords of wood,	16,648
Shingles,	10,589,500
Number of arrivals of steamboats from January 1st, 1840, to January 1st, 1841,	1,721
Whole amount of tonnage,	244,185
Average tonnage,	142
Number of arrivals of flat boats,	56
" feet of lumber,	9,977,375
" cords of wood,	25,114
" shingles,	6,433,500
" staves,	467,250
" hoop poles	44,850
" rails,	8,950
Arrivals of steamboats from January 1st, 1841, to January 1st, 1842,	1,928
Tonnage,	262,681
Average tonnage,	136
Cords of wood at the wood landing,	4,596
Below the creek, about,	2,000
Feet of lumber,	9,550,528
Shingles,	8,512,710
Staves,	382,159

The number of boats owned in 1241 by citizens of St. Louis, was 83. When we remember how short a period has elapsed since St Louis started into important existence, and contrast her position then with what it is now, some adequate idea may be formed of the rapid strides which have been made in agriculture, manufactures and civilization within a few fleeting years by the portion of the great west with which St. Louis is so immediately connected. And yet she must be merely in her infancy as a city. Thousands of emigrants will pass beyond her this year, and locate themselves in the rich lands above, which invite their footsteps. Nay, new and wonderful cities will start into existence along the borders of the navigable water courses, perhaps for a thousand miles above her, and the wildest imagination, looking at that region of country now, would not, in all probability, be able to give even a faint outline of its appearance a century hence.—*Philadelphia Inquirer and National Gazette.*

RAILROADS.

It may, we think, be safely stated, that our knowledge of the ultimate value of railroads, is, as yet, comparatively nothing. We see only the effect of infant energies and incipient efforts, and as we cannot tell what may be the mature developments, even of the most promising child, so, neither can we, at present, say what shall

be the future and mature value of that system of intercommunication of which we are now enjoying but the earliest fruits.

We look upon what has been done, as but so many corroborative experiments of what may yet be accomplished, and as so many incitements to further and more enlarged operations. Our lines of railroad have hitherto been short, spanning small tracts of country, and uniting only proximate cities. We have hardly begun to try the effects of a long, unbroken chain, uniting many districts, many cities, many interests, many states;—linking the sea shore to the mountains, the mountains to the valleys, and the valleys to the head waters of its navigable streams.

The progress of "The Great Western Railroad," which is so rapidly connecting Boston with the "Far West," is the most daring enterprise of the kind which has been started, and will, we are assured, by its success, call into being schemes equally far-reaching and attractive. There must be other Atlantic outlets for the West, besides Boston. Its western railroad cannot become to the great Valley a "Mississippi" of railroad, making the whole West tributary to its channel; its business must inevitably be divided between the Atlantic sea ports, and Savannah asserts her claim to a portion under advantages which ought not to be overlooked. There is not a city south of Baltimore, more favorably situated for enlisting a large share of the trade of the West and South West than this city, and if the facilities offered can be seized upon and improved; if the interests of the people, not of the city merely, but of the state could be enlisted for the enterprise; if the popular and legislative energies of this Commonwealth could be converged upon this point, a highway of steam might, in a short time, be thrown up between those distant sections, which would enhance the agricultural, commercial, social and political advantages of each. It is true that the prospect of the carrying out of such a plan is not at present very bright, but that does not prevent our hoping for better things, and occasionally calling the attention of our citizens to an enterprise, which, before many years, we hope to see uniting in iron bands the "Father of Rivers," with the seaboard of Georgia. It is pleasant, sometimes, to send out our thoughts in advance of the times, and while the age is halting in doubt and embarrassment, to let them, like the spies of old, revel in the land of promise, and bring back from it those rich fruits and those good reports, which shall stimulate us to go forward and enter upon their possession.

Georgian.

RAILROAD CARS.

We observed a few days ago, a train of six beautiful railroad cars from the manufactory of Mr. Davenport, at Cambridgeport, capable of accomodating about 50 persons each, passing over the Boston and Worcester railroad, destined to Rochester. We were struck with the facility with which these large vehicles could be transported to such a distance, on an inland route. They probably reached

Rochester on the day after they left Boston, a distance of more than 400 miles, and without being removed from the railroad track, except for the purpose of being transported across the Hudson at Albany. We find the following announcement of the arrival of these cars, in the Rochester Evening Post.

Modern Luxuries—Magnificient Railroad Cars.—Yankee ingenuity is rarely more pleasantly exemplified than in the luxurious arrangements for railroad travelling, of which we have now in Rochester, a magnificient specimen—in the splendid train of passenger cars just launched for the service of the sovereign people, on the Auburn and Rochester Railroad.

There are six cars, designed to form two trains. The cars are each 28 feet long and 8 feet wide. The seats are well stuffed and admirable arranged—with arms for each chair, and changeable backs that will allow the passenger to change "front to rear" by a manœuvre unknown in military tactics. The size of the cars forms a pleasant room, handsomely painted, with floor matting, with windows secured from jarring, and with curtains to shield from the blazing sun. We should have said *rooms;* for in four out of six cars, (the other two being designed only for way passengers,) there is a ladies' apartment, with luxurious sofas for seats, and in recesses may be found a washstand and other conveniences. The arrangement of the apartment for ladies, we consider the greatest improvement; and it will remedy some serious objections that have hitherto existed against railroad travelling on the part of families, especially where any of the members are in delicate health. The ladies can now have their choice either of a sofa in their own apartment, or a seat in the main saloon of the cars, as their health and inclination may require.

These cars are so hung on springs, and are of such large size, that they are freed from most of the jar, and especially from the swinging motion so disagreeable to most railroads.

The lamp of each car is so placed as to light inside and out; and last though not least, the breakers are so arranged as to be applied readily and with great power—thus garding against the danger of collisions, etc.

On the whole it would be difficult to imagine any improvements that could be desired, though we dare say, these down-easters will rig out some new "notions" ere long, which will furnish. "board and lodging" as well as a mere passage on the railroads.—"The cars are worth a sight, even if one has neither time nor money (as some of us printers have not) to indulge in the luxury of a ride.

We mention these matters with satisfaction as indications of the strong desire manifested by the Auburn and Rochester railroad company, to render their line of conveyance as satisfactory as possible to the travelling public.

N. B.—We almost forgot to mention that these beautiful cars were made by Davenport and Bridges, of Cambridge, Massachusetts, and cost at low prices about $1700 each—or $10,000 for the six. This firm keeps about one hundred men in employment and

have orders on hand now for some eight hundred cars of all sorts. Mr. Bridges is now here on a visit.—*From the Boston Patriot.*

THE BOSTON AND WORCESTER RAIL ROAD.—The Directors of this railroad have presented their 14th annual report. The following is a brief abstract from the Boston Daily Advertiser:

"The new stock created by vote of the stockholders has been taken up with the exception of a few shares. Twenty miles of the new track are now in use from Needham to Westborough. It is proposed to extend this tract, this season, from Needham to Newton Corner, and from Westborough to Grafton. Iron will be imported for this work, and the whole will be ready to lay down next season. Measures will be taken to render the track permanent, by the introduction of a gravel foundation in many of the wet and clayey parts of the road. A great proportion of the sleepers which were laid down on the first completion of the road, are decayed and require removal. To supply their place with new ones, funds have been reserved from year to year. The number of new sleepers required to be laid this year, will be about 26,000 —being about the same number as were required last year.

Four daily trains have run regularly the last year, besides two freight trains. The trips of the ordinary trains, which stop ten times in the course of 45 miles, are made in two and a half hours, and those of the steamboat train, which makes but one stop, in two hours.

The amount of income during the year ending on the 31st day of December last, was $310,807 80; and of expenditures, $162,998 58, making a net profit of $147,808 29. The receipts from passengers in the six months, to the commencement of the present month, amounted to $81,029 80, and the earnings from freight in the same period, $61,012 55, making a gross income from these two sources, of $142,042 35. This is an increase compared with the income from the same sources during the corresponding period of last year of $24,143 72, of which $16,983 is on passengers, and $7,160 on freight. The amount of expenses for this half year is not yet made up.

The Directors express themselves highly satisfied with the present condition of the road.

THE FUMIGATIAG HOUSE OF ODESSA.—The house for fumigating the luggage was a short distance from us. The room in which this took place is large enough to contain a portion of each person's but the system was bad, and a want of activity was evinced in the late hours that were kept, for no one was stirring before ten o'clock. When the director was seen, a rare occurrence, he appeared to flit by us like a jack o'-lantern. The men employed in the fumigating department were dressed in suits of coarse leather, and gloves of the same. Their dexterity in opening trunks and finding out secret drawers was quite amusing. The Bramah locks opened as if by magic, and Mr, Chubb would

here have lost his premium. Such was the severity, and the extent to which it was carried, that hair in rings, brooches and lockets were taken out, and the lining of the dressing cases as well as the carriage cushions, were ripped open. Every article of metal as well as silk that was submitted to the action of the chloride was injured, and several of my antique lamps in "terra cotta" were broken. The "traiteur," an old Italian, was the only decent fellow about the place, and supplied us with linen and bedding, for the rooms were entirely without either. His wines were very fair and charges moderate. The revenues of the establishment must be great, for even the situation of "restaurateur" is farmed, and besides the charge for the rooms there was one trouble a day to pay for the guardians. Six month's rent at the rate we paid for two rooms, would have built the house.—*Captain Jesse's Notes of a Half-pay.*

Academy of Sciences.—The greater portion of the time occupied by the two last sittings was engrossed with the reading of papers on abstruse science; but some communications were read, which were not without interest beyoud the comparatively limited circle of those who devote their time to elementary investigations. A paper by M. Regnault, on dilating powers of gases, and on the relative powers of air and mercurial thermometers, was listened to with great attention. The object of M. Regnault in the experiments, of which he has given an account to the Academy, was: first, to study the dilation of gases within the same limits of temperature, but under different amounts of pressure; secondly, to ascertain the dilation of air in elevated temperatures, measured by means of the mercurial thermometer. As regards the first problem, it is the generally received opinion of natural philosophers, that the dilatation of gaceous matters is always the same, within the same limits of temperature, whatever may be the pressure to which they are subjected. M. Regnault, in order to test this doctrine, performed a series of experiments on the same volume of gas under the same or different degrees of temperature, and the result of them is, that the dilatation of air or other gas under pressure is more or less pronounced, according to its density. As regards the second problem, viz. the comparative power and correctness of the air and mercurial thermometers, he finds that up to 100 degrees there is no variation of sufficent importance to be worthy of consideration. Beyond 100 and up to 250 degrees, the variation is also small; at 300 the difference is one degree; at 325 degrees it is 1 degree 75; and at 350 the difference amounts to 3 degrees,

Corn Oil.—The Buffalo Commercial Advertiser, in relation to a paragraph on Corn Oil, which appeared in the Traveller some time since, says:

"Corn Oil is only obtained during the fermentation of the meal, preparatory for distillation, in the manufacture of whiskey. It rises on the surface of the beer in the mashing tubs or vats, and is taken up with a ladle. Twenty bushels of corn seldom yield more

than six or eight quarts of oil. It is only in large distilleries that oil enough can be saved to render its preservation any object. Many attempts have been made to express oil from corn, by a process similar to that pursued in the manufacture of linseed oil; but hitherto, not enough has been obtained to render the business profitable."

Railroads in Germany.—It is said that the system of public improvement is making wondrous progress in Germany. Rail roads are established in every quarter. The little kingdom of Wertemberg, with a population of not quite two million, proposes to lay out fifty million of florins (a little over twenty million of dollars—in rail roads alone; and a number of canals and railroads are also in progress.—*Am. Traveller.*

The Danville Democrat says:—The Columbia Anthracite Furnace, which we stated had been blown out, is in perfect and sound condition. She had suffered nothing during the fifteen months she has been in blast, and we understand, that if she should be blown in again towards fall, it will be done on the same hearth, and without any alterations or repairs in the stack. This is another evidence of the complete success of the new method of smelting iron ore with anthracite.

Enormous Profits from some of the Mines in England.—The increased consumption of gas in all metropolitan cities, the vast number of steam ships of war, sailing to and from the ports of the old world, and upon the seas in every clime, has caused an immense and permanent demand for soft coals. An extra number of hands have been employed in all the principal colleries, and the proprietors of the best coal-fields in the territory of Great Britain are heaping up princely fortunes, from the profits of their business. We have heard of one individual, who has made between four and five millions, during a few years past, from the mines owned by himself alone.—*Am. Traveller.*

Western and Atlantic Railroad. We understand that the chief Engineer of the Western and Atlantic railroad has started on to the north after Iron for a track, and engines for the cars for the road. They have been for some time laying down the timber on the other end of the road, and will in a few brief months, be prepared to receive the cars for the first fifty miles. In the mean time the grading on this end of the road is gradually but regularly coming to a completion. Thus, in despite of the obstinate opposition which the road has had to encounter from its projection, and the unprecedented decline of State Stocks, the friends of the grand enterprise are permitted to exult in the fair prospect of the successful completion of the road at no distant day.—*Chuttanooga Gazette.*